Inyo-Mono *INTEGRATED REGIONAL WATER MANAGEMENT PROGRAM*

Round 2 Planning Grant Proposal

Fulfilling Plan Standards through Focused Planning Studies and Programmatic Operations

Prepared by: Holly Alpert, Ph.D, Mark Drew, Ph.D, Janet Hatfield, and Rick Kattelmann, Ph.D, on behalf of the Inyo-Mono Regional Water Management Group

This page intentionally left blank

Acknowledgements

The authors would like to thank representatives from The Inyo National Forest, Fort Independence Indian Reservation, California Trout, Inyo/Mono Agricultural Commissioner's Office, the Town of Mammoth Lakes, and Inyo County for their contributions to the planning studies included in Chapters 2 and 7. The authors would also like to thank and acknowledge all involved in the Inyo-Mono Integrated Regional Water Management Group. Together, you all have made the Inyo-Mono IRWM Program is what it is today.

This page intentionally left blank

Table of Contents

List of Tables

List of Figures

This page intentionally left blank

Work Plan

Introduction

In late 2007, a small group of forward-looking people gathered in Mammoth Lakes to discuss the possible formation of an Integrated Regional Water Management (IRWM) program, recognizing the opportunities to pursue and secure resources for the rural and sparsely-populated eastern Sierra region. Since then, substantial progress has been made in establishing and implementing the Inyo-Mono Integrated Regional Water Management Planning Program. An integral part of this progress was the completion and adoption of the Phase I Inyo-Mono IRWM Plan in December, 2010. This success was accomplished with extremely limited resources but a great deal of dedication from the Inyo-Mono Regional Water Management Group (RWMG). Today, the effort enjoys formal support from 30 organizations throughout the region, and many more stakeholders have provided their assistance and backing when needed. Indeed, such widespread support is the result of more than 100 meetings over the last four years, including dozens of public and targeted outreach meetings in small, rural, and economically disadvantaged communities.

Recognizing the need to improve the Phase I Plan, Round 1 Planning Grant funding was secured. One intended outcome of the Round 1 Planning Grant funds is an analysis of regional planning gaps to help us in developing an IRWM Plan that responds to the current and future needs of the region to the fullest extent possible.

This Round 2 Planning Grant proposal speaks to responding to the identified planning needs of the region, based on the work in the Round 1 Planning Grant, as well as the need to maintain momentum with respect to the Inyo-Mono IRWM Program. The Inyo-Mono Program, while fully established and functioning, has high aspirations and intentions to maximize the opportunity to respond to the profound needs and priorities of the region. This will require, among other things, continued engagement of stakeholders to build stronger partnerships, diversification of funding strategies in order to realize necessary financial resources, and an ability to acquire and utilize state-of-the-art water resources-related technologies.

The Round 2 Inyo-Mono Planning Grant proposal is broken down into six main categories of activities (Chapters) deemed critical to the long-term success of the Inyo-Mono RWMG. Within each chapter, a number of tasks are specifically called out that will provide the roadmap for achieving the work of that chapter. Chapter 1 focuses on enhancing operations associated with the Inyo-Mono IRWM Program. Chapter 2 is comprised of a series of Planning Studies that respond directly to issues and priority needs of the region based on continued dialogue within the Inyo-Mono RWMG and recent public outreach meetings. Within each of the Planning Studies, individual tasks and sub-tasks indicate the specific work to be accomplished. Chapter 3 responds to the uncertainties of climate change and the likely impacts to the hydrology of the region. Chapter 4 addresses the continuing need to improve the technological capacity of the RWMG. Chapter 5 identifies long-term financial needs to sustain the Inyo-Mono IRWM Program. Chapter 6 focuses on the synthesis of results from Chapters 1-5 to update the Inyo-Mono IRWM Plan to more fully meet Prop. 84 IRWM Plan Standards. Included in this chapter is

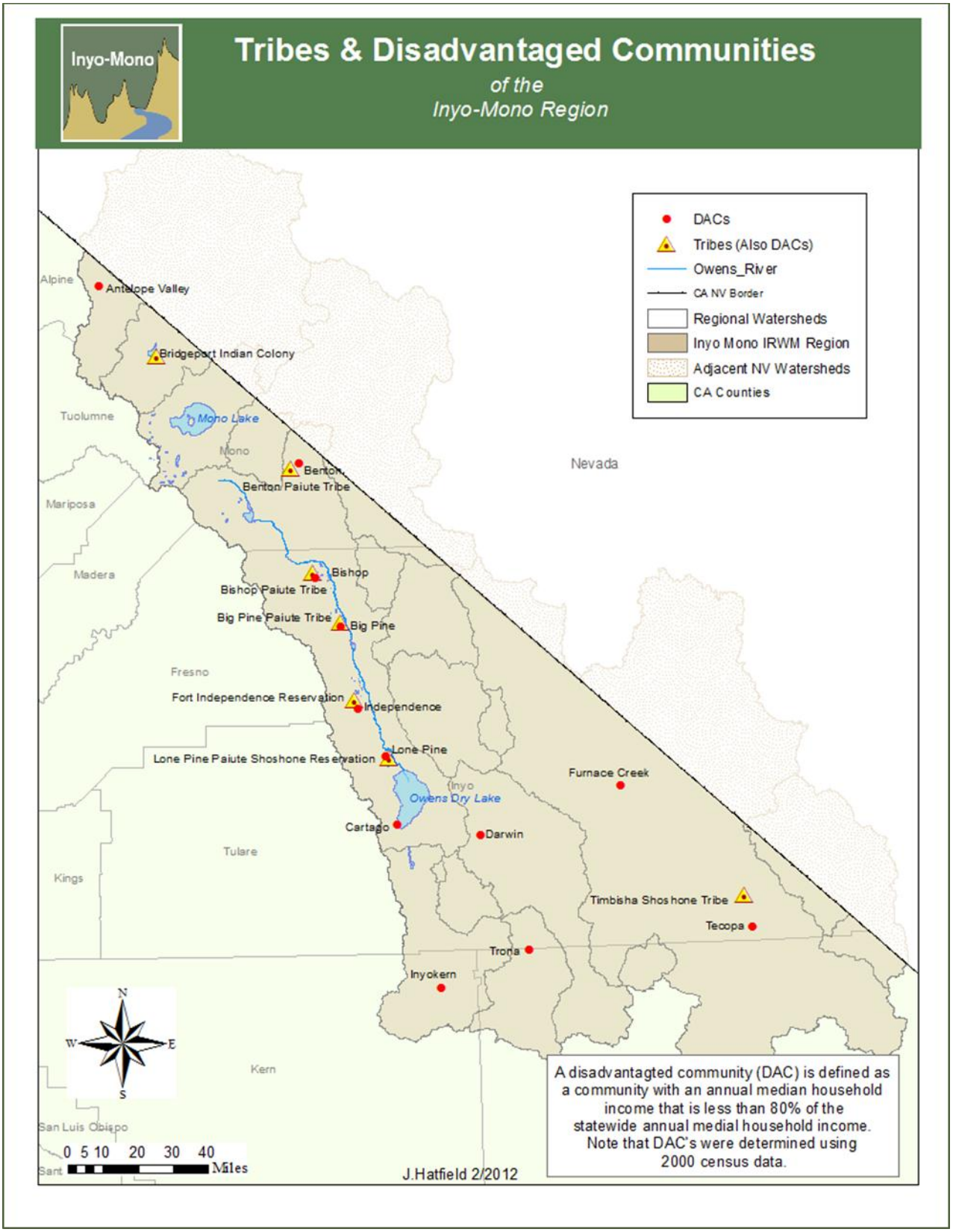
a consideration of the concept of integration and how to properly address integration in our widespread and diverse region. Finally, Chapter 7 highlights planning studies that fall under Additional IRWM Plan Work and that support planning needs of the region. These studies will serve to further enhance the Inyo-Mono IRWM Plan.

Disadvantaged Community Involvement and Benefits

The Inyo-Mono IRWM Program has been committed to engaging and involving disadvantaged communities (DACs) in the IRWM planning process since the Program's inception. DACs exist throughout the region and comprise a substantial portion of the population (Figure 1). Of the 30 Members of the RWMG, eight are either DACs or represent DACs. In the Round 1 Planning Grant, the Inyo-Mono RWMG focused on assessing needs and building capacity for DACs. In addition, the Inyo-Mono IRWM Program was awarded one of the five DAC pilot project grants, and that project will be ongoing in tandem with the Round 2 Planning Grant work. The Round 2 Planning Grant will continue to emphasize involvement by DACs in the planning process through continued focused outreach meetings to discuss climate change, technology, and funding issues, as well as continued participation in the RWMG and Administrative Committee. Three of the four proposed planning studies discussed in Chapter 2 will directly benefit DACs in the region. Approximately $235,000 (~35%) of the total funding request will support DACs (for more detail on DAC funding support, see Budget narrative [Attachment 4]).

Similar to the concerted effort to engage and support the needs of DACs, the Inyo-Mono IRWM Program has conducted extensive outreach to Tribal entities throughout the planning region. Such efforts have resulted in significant engagement of Tribal representatives and have improved the understanding of Tribal water-related needs in the region.

Figure 1: Tribes and Disadvantaged Communities of the Inyo-Mono Region



Current Status in Meeting IRWM Plan Standards

The Phase I Inyo-Mono IRWM Plan, developed and adopted in 2010, comprehensively addresses several IRWM Plan Standards and partially addresses others. Those that are more fully addressed in the Phase I Plan include Governance, Region Description, Objectives, Resource Management Strategies, Relation to Local Water Planning, and Relation to Local Land Use Planning. Through the development of the Phase II Inyo-Mono IRWM Plan, which will be completed in the summer of 2012 through the Round 1 Planning Grant, several of the Plan Standards will be enhanced and expanded upon; most notably, Climate Change, Stakeholder Involvement, Relation to Local Land Use Planning, Project Review Process, and Data Management. It is recognized, however, that because revised Plan Standards are expected with the release of the revised Plan Guidelines, the Phase II Inyo-Mono IRWM Plan will not be able to fully address all Plan Standards. Thus, the Round 2 Planning Grant will allow the Inyo-Mono RWMG to focus on those Plan Standards that have not yet been fully met. Table 1 depicts how the overall work of the Inyo-Mono IRWM Program as well as the individual Planning Studies will contribute to meeting the IRWM Plan Standards. **The following Plan Standards will be specific areas of focus for the Round 2 Planning Grant work: Integration, Plan Performance and Monitoring, Data Management, Finance, Technical Analysis, and Climate Change.** In particular, the Program Office work (Chapters 1, 3, 4, 5, 6) will directly address several of these Plan Standards in an attempt to bring the Inyo-Mono IRWM into compliance with these standards.

Table 1: Round 2 Proposal Plan Standards

INYO-MONO IRWM PROGRAM **Round 2 Planning Grant** **Current Status in Meeting IRWM Plan Standards** **Plan Standard**	Inyo-Mono IRWM Program Office (Chapters 1, 3, 4, 5, 6)	Oak Creek Stream Stabilization Technical Study	West Walker River Restoration Planning Study	Town of Mammoth Lakes Stormwater Management Plan	Inyo/Mono Watersheds Invasive Plant Inventory	Additional IRWM Plan Work
Governance	♦					
Region Description	♦	♦	♦	♦	♦	♦
Objectives	♦	♦	♦	♦	♦	♦
Resource Management Strategies	♦	♦	♦	♦	♦	♦
Integration	♦	♦	♦	♦	♦	♦
Project Review Process						
Impact and Benefit	♦	♦	♦	♦	♦	♦
Plan Performance and Monitoring	♦					
Data Management	♦	♦		♦	♦	♦
Finance	♦	♦	♦	♦		♦
Technical Analysis	♦	♦	♦	♦	♦	♦
Relation to Local Water Planning	♦	♦	♦	♦		♦
Relation to Local Land Use Planning	♦	♦	♦	♦	♦	♦
Stakeholder Involvement	♦	♦	♦	♦	♦	♦
Coordination	♦	♦	♦	♦	♦	♦
Climate Change	♦	♦	♦	♦	♦	♦

The overall objectives of this proposal are to further refine and enhance the Inyo-Mono IRWM Plan while also putting in place strategic actions necessary for the long-term sustainability of a growing program recognized as a leader in responding to the water-related needs of the planning region. The planning studies in Chapter 2 explicitly respond to identified planning needs relating to flood, stormwater and ecosystem management. It is intended that the updated Plan will serve as the basis for the next 3-5 years of water-resources planning and management for the Inyo-Mono IRWM Region. Furthermore, we expect that, through regular updates that reflect new information and changing conditions, the Inyo-Mono IRWM Plan will continue to be useful addressing the long-term water needs of the region.

This page intentionally left blank

Chapter 1: *Sustain and build upon Inyo-Mono IRWM Program operations*

In eastern California, the Inyo-Mono IRWM Program has set the standard for building collaborative processes, engaging varied stakeholders, and addressing region-wide issues. Other groups have looked to the Inyo-Mono IRWM Program as a model in these areas. For example, the Owens Lakebed Planning Committee adopted the same structure and governance that the Inyo-Mono RWMG did in the beginning, and representatives from this group continue to seek advice from RWMG Members and Program Staff. In addition, other IRWM regions in the Sierra Nevada and beyond have looked to the Inyo-Mono region for guidance on how to develop and implement regional planning efforts. For four years, the Inyo-Mono RWMG has been committed to bringing necessary resources and assistance to the region, especially to DACs, Tribes, and small water systems. A primary goal of this effort has been increasing local and regional capacity to more effectively respond to identified needs and build long-term sustainability. The Inyo-Mono IRWM Program has now established itself as the go-to forum for discussing water issues and needs, matching internal resources to groups requiring assistance, and finding external sources of funding and technical expertise. However, it is also recognized that more work is needed to realize the full potential of the RWMG.

The primary objective of Chapter 1 is to continue regular Inyo-Mono IRWM Program operations, which include working with stakeholders on a daily basis while conducting regular RWMG, Administrative Committee, and working committee meetings. Through this work, we will also return to the governance and organizational structure of the RWMG with the intention of ensuring the Program's structure is resilient and has long-term viability for the RWMG.

While it will be of utmost importance to maintain our presence in the region and to continue providing a forum for collaboration and securing resources, the RWMG also desires to be involved at larger levels of thinking about integrated resources management. Thus, **a second objective of this chapter is to leverage the work of the Inyo-Mono RWMG to continue collaborations with currently established statewide groups, create new alliances, and take the lessons learned and success stories from the Inyo-Mono region to share with others throughout California and the western United States.**

Chapter 1 Tasks

Task 1.1 Meetings and stakeholder communications

Plan and convene regularly-scheduled Inyo-Mono RWMG and Administrative Committee meetings, as well as working committee meetings as needed. The RWMG will convene bi-monthly *or* up to nine (9) meetings throughout the grant period. The Administrative Committee will convene monthly *or* up to eighteen (18) meetings throughout the grant period in order to help the Program Office continue the regular business of the RWMG. Meetings will focus on responding to regional water-related needs as well as monitoring the planning

studies described in Chapter 2. Meetings will also be used to incorporate findings from the planning studies into the Inyo-Mono IRWM Plan to more fully meet the Prop. 84 Plan Standards (Chapter 6). Work in this task will include building and maintaining relationships both with RWMG Members and other stakeholders as needed.

Task 1.2 Governance and organizational structure

During the grant period, the RWMG will provide opportunities to revisit its governance process and organizational structure based on work completed through the Round 1 Planning Grant. The goal of this work will be to develop a long-term governance and organizational structure that will position the RWMG to realize a robust portfolio of funding opportunities based on the long-term sustainable funding strategy proposed in Chapter 5.

Task 1.3 Grant and project administration

The Program Office will provide grant and project administration for the Round 2 Planning Grant, and the Administrative Committee will provide fiscal oversight. This task will include working with DWR to finalize and sign a grant agreement between DWR and California Trout and providing reports and invoices to DWR on a regular basis (timing to be agreed on in the grant agreement). This task will also include working with sponsors of the individual planning studies to ensure progress and regular reporting and invoicing.

Task 1.4 Liaison with statewide planning entities

The Program Office will continue to serve as a liaison between the Inyo-Mono RWMG and larger resources planning entities such as DWR, the Sierra Water Workgroup, and the IRWM Roundtable of Regions. Building upon previous work with these groups, the Program Office will seek to increase the leadership and influence of the Inyo-Mono RWMG with respect to statewide water planning priorities.

Task 1.5 Conference presentations

In an attempt to bring the lessons learned and success stories from the Inyo-Mono IRWM region to a broader audience, representatives from the Inyo-Mono RWMG will attend up to two conferences to present the work of the Inyo-Mono RWMG as a case study. The goal of this task is to contribute to work at broader scales related to integrated resources management.

Deliverables

- Convening of RWMG, Administrative Committee, and working committee meetings, including development of schedules, agendas, and meeting summaries
- Report on long-term plan for RWMG governance and organizational structure
- Regular reports and invoices to DWR
- Presentations given at conferences or other meetings and workshops

Chapter 2: Planning Studies

This chapter describes four planning studies that have been identified to help meet priority needs in the Inyo-Mono region, especially with respect to stormwater/flood management and ecosystem management, and address planning gaps in the Inyo-Mono IRWM Plan. These Planning Studies, in order of importance as determined by the Inyo-Mono RWMG, are presented as follows:

Planning Study A: Oak Creek Stream Stabilization Technical Study

Planning Study B: West Walker River Restoration Planning Study

Planning Study C: Town of Mammoth Lakes Stormwater Management Plan

Planning Study D: Inyo/Mono Watersheds Invasive Plant Inventory

Figure 2 depicts all planning studies included in this Planning Grant proposal, including the additional work described in Chapter 7 and the overall Program Office operations.

Inyo-Mono Objectives and Resource Management Strategies

These four planning studies, as well as the additional work described in Chapter 7, help to further the Objectives and Resource Management Strategies (RMSs) developed in the Phase I Inyo-Mono IRWM Plan. While some parts of each objective are addressed through the work proposed here, Objectives 1, 2, 3, and 6 are especially highlighted through this proposal. In addition, it is expected that in the Phase II Inyo-Mono IRWM Plan, specific Objectives and associated Resource Management Strategies regarding stormwater/flood management and groundwater management will be added. The planning studies in this proposal help to begin addressing stormwater/flood management. Table 2 shows how each planning effort relates to the Inyo-Mono Objectives and RMSs.

Figure 2: Inyo-Mono IRWM Round 2 Planning Studies

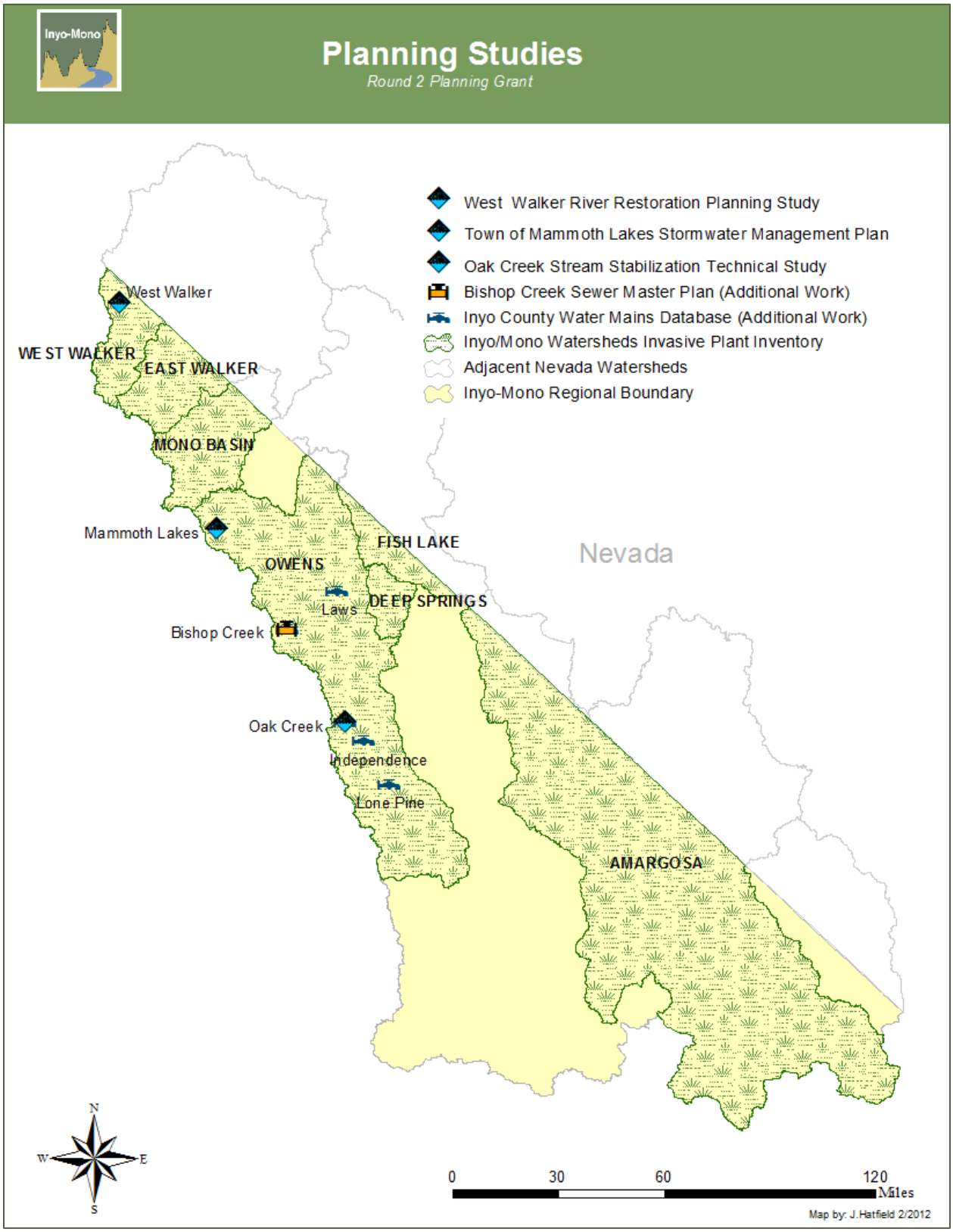


Table 2: Planning Study Relevance to Inyo-Mono Objectives and Resource Management Strategies

INYO-MONO IRWM PROGRAM **Phase I Objectives &** *Resource Management Strategies*	Oak Creek Stream Stabilization Technical Study	West Walker River Restoration Planning Study	Town of Mammoth Lakes Stormwater Management Plan	Inyo/Mono Watersheds Invasive Plant Inventory	Additional IRWM Plan Work
Objective 1: Protect, conserve, optimize, and/or augment water supply					
Improve water supply reliability		♦			♦
Improve system flexibility and/or efficiency					♦
Support compliance with current and future state and/or federal water supply standards	♦				♦
Address local water supply issues through various techniques, including, but not limited to: groundwater recharge projects, conjunctive use of water supplies, water recycling, water conservation, water transfers, and precipitation enhancement	♦				♦
Advance understanding of regional groundwater issues (including monitoring) and provide for solutions					
Optimize existing storage capacity	♦				♦
Conserve and/or adapt water uses to future conditions		♦			♦
Capture and manage runoff	♦		♦		
Incorporate and/or implement low-impact development design features, techniques, and/or practices to reduce water demand					
Support appropriate recreational activities	♦	♦	♦		♦
Objective 2: Protect, restore, and/or enhance water quality					
Support compliance with current and future state and/or federal water quality standards	♦	♦	♦		♦
Improve the quality of urban runoff, storm water, and/or wastewater	♦	♦	♦		♦
Reduce erosion and sedimentation	♦	♦	♦	♦	
Protect public and/or aquatic ecosystem health	♦	♦	♦		♦
Match water quality to water use	♦	♦			♦
Support appropriate recreational activities	♦	♦	♦		♦
Objective 3: Provide stewardship of our natural resources					
Protect, restore, and/or enhance natural processes, habitats, and/or threatened and endangered species	♦	♦	♦	♦	♦
Protect, restore, and/or enhance ecosystems such as upland forests and meadows dependent on surface/shallow water supply	♦	♦	♦	♦	♦
Enhance recreational and/or educational opportunities	♦	♦	♦		♦
Identify, develop, and implement efforts to better control invasive species	♦	♦		♦	
Assess ecosystem health of watersheds in the region	♦	♦	♦	♦	♦
Objective 4: Maintain and enhance water, wastewater, and/or power generation infrastructure efficiency and reliability					
Systematically and strategically rehabilitate and replace aging water, wastewater delivery and/or wastewater treatment facilities in rural communities, including tribal lands					♦
Ensure fire protection capacity					♦
Improve energy efficiency of water systems and uses					♦
Promote use of water efficiency in power generating facilities					
Objective 5: Address climate variability and/or reduce greenhouse gas emissions					
Increase understanding of water related greenhouse gas emissions					♦
Manage and modify water systems to respond to increasing climate variability	♦	♦	♦	♦	♦
Use cleaner energy sources to move and treat water					
Objective 6: Increase participation of small and disadvantaged communities in IRWM process					
Engage regional communities in collaborative water and natural resource related efforts	♦	♦	♦	♦	♦
Provide assistance for tribal and DAC consultation, collaboration, and access to funding for water programs and projects	♦	♦		♦	♦

Planning Study A: Oak Creek Stream Stabilization Technical Study

Introduction

This study will focus on completing a technical study to address ongoing threats from flood and stormwater events in the Oak Creek watershed. On July 12, 2008, a large debris/mud flow triggered by an intense rainfall event caused extensive hillslope rilling and channel gullying of the mid- and lower elevation segments of both the North Fork and South Fork of Oak Creek, which burned in the Inyo Complex fire of July, 2007. The Oak Creek watershed drains approximately 16,000 acres of the eastern Sierra Nevada, with its headwaters reaching over 13,000 feet in elevation. The majority of material deposited was scoured from upland stream channels, although the hillslopes were extensively rilled. The debris flow severely damaged four buildings within the historic Mt. Whitney Fish Hatchery complex, killing all the hatchery trout and burying the fish rearing ponds. The mud flow also severely damaged or destroyed 50 homes. In addition, the mud flow crossed State Hwy. 395, temporarily closing the road, disrupting traffic for nearly a week and causing damage to the road bed.

Currently, both the North and South Fork of Oak Creek contain actively eroding, braided stream channels and highly unstable stream banks. Both streams are actively undercutting the stream banks, contributing to ongoing bank instability and increased sedimentation. Higher peak flows and increased turbidity are adversely affecting Fort Independence Indian Reservation infrastructure and irrigation systems. The Mt. Whitney Fish Hatchery operations remain closed as Oak Creek is the fish-rearing water source. The mud flow, while revegetating on its own, contains a large amount of undesirable weed species adversely affecting native plant communities and overall watershed recovery.

The Inyo County Board of Supervisors continues to affirm the area as a local emergency as a result of the Oak Creek mud flow. In addition, there is continued risk to Los Angeles Department of Water and Power infrastructure, including water conveyance structures. Residents who live along the upstream portions of Oak Creek are part of the town of Independence, which is a DAC. Fort Independence Indian Reservation, though not technically designated as a DAC based on 2000 Census Median Household Income data, is recognized as a sovereign Native American Tribe. Furthermore, based on more recently-available data, it is expected that Fort Independence Indian Reservation would be considered a DAC. Therefore, this planning study directly benefits two DACs, one of which is also a Tribe.

This planning study will address a region-wide need to develop flood and stormwater management planning. This study will also contribute to the broader goal of developing resource plans that address a specific watershed-level need yet also may have direct application to other

watersheds within the Inyo-Mono planning region. The Phase I Inyo-Mono IRWM Plan did not identify stormwater/flood threat mitigation as a priority need, nor were ecological stewardship or restoration recognized as priorities in the Round 1 Implementation Proposal. Since completing the Phase I Inyo-Mono IRWM Plan, and based on RWMG discussions and recent outreach efforts conducted by the Program Office, watershed-level studies, including flood and stormwater threat mitigation and management, have been identified as explicit needs for the region. This planning study responds directly by helping to fill those gaps. The Stream Stabilization Technical Study will ultimately be added to the Inyo-Mono IRWM Plan as an appendix, and the necessary sections of the IRWM Plan will be updated as applicable.

Objectives

This planning study aims to systematically identify and prioritize needed restoration management actions for the severely damaged Oak Creek watershed. This study may also serve as a template for future proposed management actions within other fire/flood damaged watersheds, which are a common occurrence in our remote fire-prone region. Additionally, this study will provide the basis for eventual physical implementation of the generated management recommendations. The overall objectives of this planning study are to:

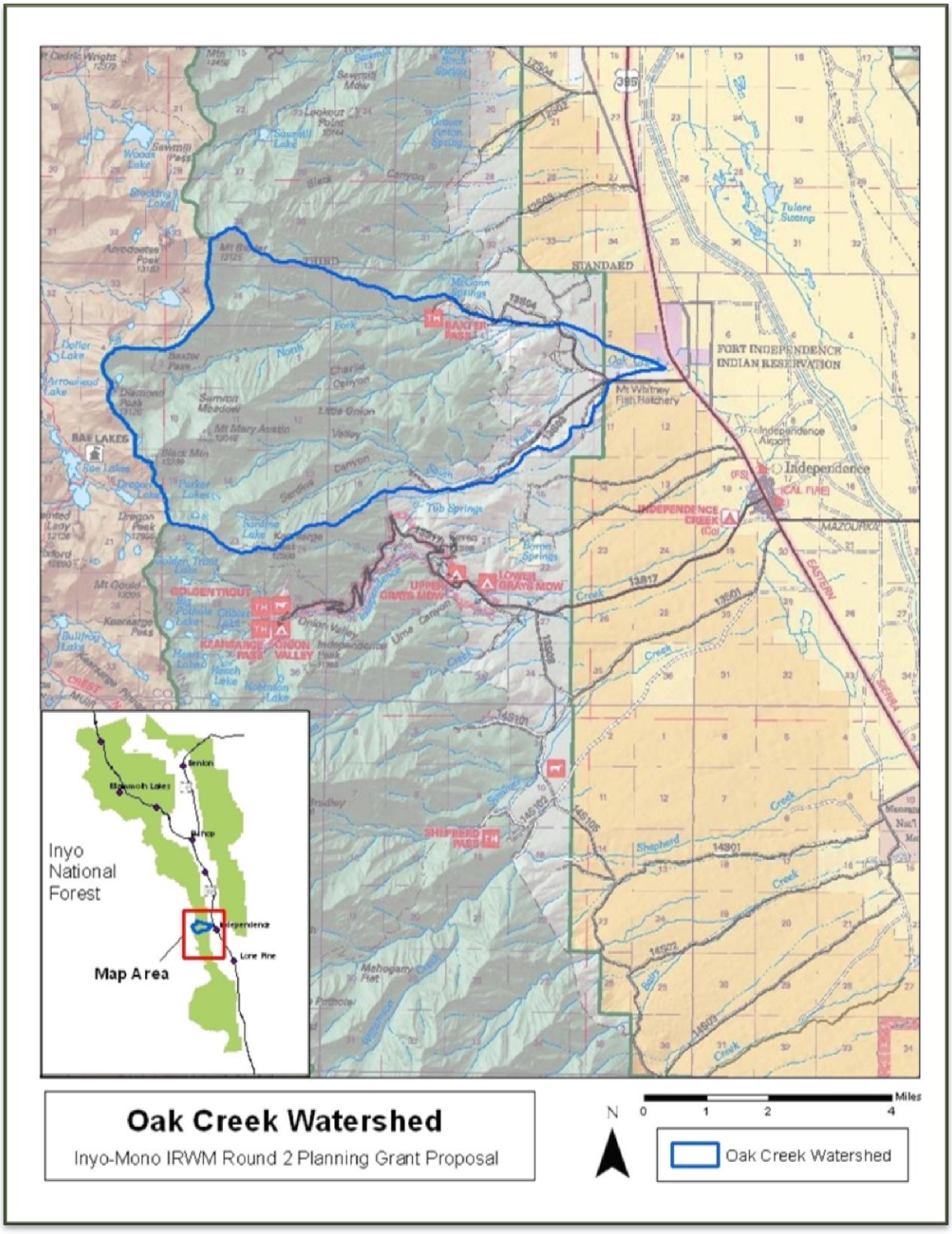
1. Further the work of the Inyo-Mono IRWM Program in terms of engaging a wide range of stakeholders in developing solutions to ongoing watershed-specific water quality and flood management issues
2. Conduct a technical study to determine short and long-term options to stabilize gully incision and unstable stream banks, attenuate flows, and reduce erosion/stream sedimentation adversely affecting downstream assets
3. Develop a restoration plan for the Oak Creek Watershed

Planning Study A. Tasks

Task 2.A.1 Project administration, coordination, and stakeholder meetings

With efforts from key members of the Inyo-Mono RWMG, including DAC representatives, we will conduct focused outreach meetings with private landowners, the Ft. Independence Tribe, Inyo County, Inyo National Forest, Natural Resources Conservation Service, Bureau of Reclamation, and California Geological Service, among others, throughout the study's duration. We anticipate these meetings to occur once per month initially and then will be scaled back to quarterly. These meetings will focus on sediment and flood potential issues and concerns within the Oak Creek watershed, including impacts to the Tribe and private residences, and short-term and long-term options to address these issues. Meetings will be announced to a broad distribution list via email, public announcements, and on the Inyo-Mono IRWMP website. It is anticipated that this group will form a Technical Advisory Committee (TAC) that will develop data collection needs and examine in greater detail potential restoration techniques. This group will report findings to the Inyo-Mono RWMG. This task will also include providing progress reports, as well as invoiced expenses and documentation of agency cost share, to the Prop. 84 Planning Grant applicant (California Trout).

Figure 3: Oak Creek Planning Study Area



Task 2.A.2 Data collection and inventory

Key technical personnel will compile relevant and available geomorphic, hydrologic, and climatic data from all available data sources and member agencies (such as those listed above in Task 2.A.1). In addition, key geomorphic, hydrologic, and climatic data will be collected throughout the watershed using accepted protocols. Data collection locations and metrics will focus on addressing issues brought forward in the stakeholder meetings. The data will be analyzed to determine scope and feasibility of implementing treatments to address stakeholder concerns. Examples of data collection include: installation of a stream gauge; establishment of channel cross sections to determine bankfull width, floodprone area, entrenchment ratio, width-to-depth ratio, and sinuosity; and bank profile measurements to determine extent of stream bank erosion. The TAC will recommend personnel to complete this task.

Task 2.A.3 Develop report with alternatives, and IRWM Plan update

Based on the data collected, the Oak Creek Stream Stabilization Technical Study report will be developed to summarize the findings, present alternatives, and prioritize opportunities to restore the Oak Creek watershed and to address issues brought forward through the stakeholder meetings, including ongoing sediment delivery and downstream flood potential. The alternatives will address the strengths and weaknesses of implementing a suite of treatments as well as a discussion on the preliminary environmental effects of the alternatives. Information in the report will be used to update the Inyo-Mono IRWM Plan. The data collection performed in this study, while specific to the Oak Creek watershed, can also be used to address the CWC §10562 Stormwater Resource Plan requirements and flood management on a regional scale.

Task 2.A.4 Presentation of results and findings

The Oak Creek TAC, made up of key community stakeholders and technical specialists, will prepare a summary of findings and present them to the community through a series of meetings discussing alternatives, including benefits and drawbacks, as well as the environmental effects and consequences. This task will also solicit feedback from the community during the presentations to ensure that key issues were addressed and that alternatives meet the objectives of the community. Community meetings and focused outreach with key stakeholders will form the basis for identifying a long-term working group that will prioritize projects for implementation and identify potential funding sources for projects identified by this plan.

Deliverables

- Outreach meeting agendas, Powerpoint presentations, materials, and handouts
- Compilation of notes and key issues brought forward by stakeholders through preliminary outreach meetings
- Inventory and assessment plan to address full scope of water quality and flood potential issues
- Summary of relevant existing data, maps, and figures
- Draft and Final Oak Creek Stream Stabilization Technical Study, including a timeline for implementing restoration projects and specific recommended actions to reduce flooding risk to downstream users and infrastructure

- Presentation of findings to communities, including meeting agendas, Powerpoint presentations, materials, handouts, and meeting notes

Planning Study B: West Walker River Restoration Planning Study

Introduction

This planning study will develop a restoration plan for the West Walker River in eastern California. An economically disadvantaged community (based on 2000 Census data), the Antelope Valley (which includes the communities of Walker, Coleville, and Topaz) in northern Mono County comprises approximately 15,000 acres, the vast majority of which is active agricultural land, used primarily for livestock grazing and alfalfa production. The West Walker River flows through the Antelope Valley and is critically important to both local livelihoods and imperiled native trout, once healthy and prolific in this waterway. However, this same area has experienced significant damage from stormwater-related flooding. Most recently, in 1997, a hundred-year flood event occurred, resulting in extensive losses of productive farmland, deleterious impacts to the West Walker River ecosystem, and marginalization of water quality and supply. Today, threats from stormwater and flood events remain due to the lack of resources necessary to address the problem. Until such threats are mitigated, functionality of the West Walker River ecosystem is compromised and additional losses of productive farmland and water quality and supply problems continue unabated.

A comprehensive river restoration plan for the West Walker River within Antelope Valley is needed to sustain livelihoods and local fisheries, provide a high-quality and reliable water supply, and fill regional planning gaps identified by the Inyo-Mono RWMG. A better understanding of the historical and current geomorphological processes associated with the West Walker River, along with assessing the current riparian habitat condition, is the first step in developing a comprehensive restoration plan emphasizing stormwater/flood best management practices. This planning study will focus on assessing approximately three miles of the West Walker River system near the towns of Coleville and Topaz with the intent of developing management recommendations to ameliorate threats that compromise water supply to Topaz Reservoir and the ecological integrity of the Antelope Valley. Such a plan will provide the basis for long-term management of this economically and ecologically important portion of the Inyo-Mono IRWM region.

This planning study will address an Inyo-Mono region-wide need to develop flood and stormwater management planning. This study will contribute to the broader goal of developing resource plans that address a specific watershed-level need yet may also have direct application to other watersheds within the Inyo-Mono planning region.

The Phase I Inyo-Mono IRWM Plan did not identify stormwater/flood threat mitigation as a priority need, nor were ecological stewardship or restoration recognized as priorities in the Round 1 Implementation Proposal. Since completing the Phase I Inyo-Mono IRWM Plan, and based on RWMG discussions and recent outreach efforts conducted by the Program Office, watershed-level studies, including flood and stormwater threat mitigation and management, have been identified as explicit needs for the region. This planning study responds directly by helping to fill those gaps.

Objectives

The objectives of this planning study are to:

1. Develop a restoration plan for the West Walker River within the Antelope Valley that will ultimately be used to restore ecological functionality this area and ensure the socioeconomic wellbeing of local residents dependent upon Antelope Valley's natural resources, particularly water
2. Address planning needs for the Inyo-Mono region, particularly those of economically disadvantaged communities, as they relate to addressing stormwater and flood management needs identified by the Inyo-Mono RWMG

Planning Study B. Tasks

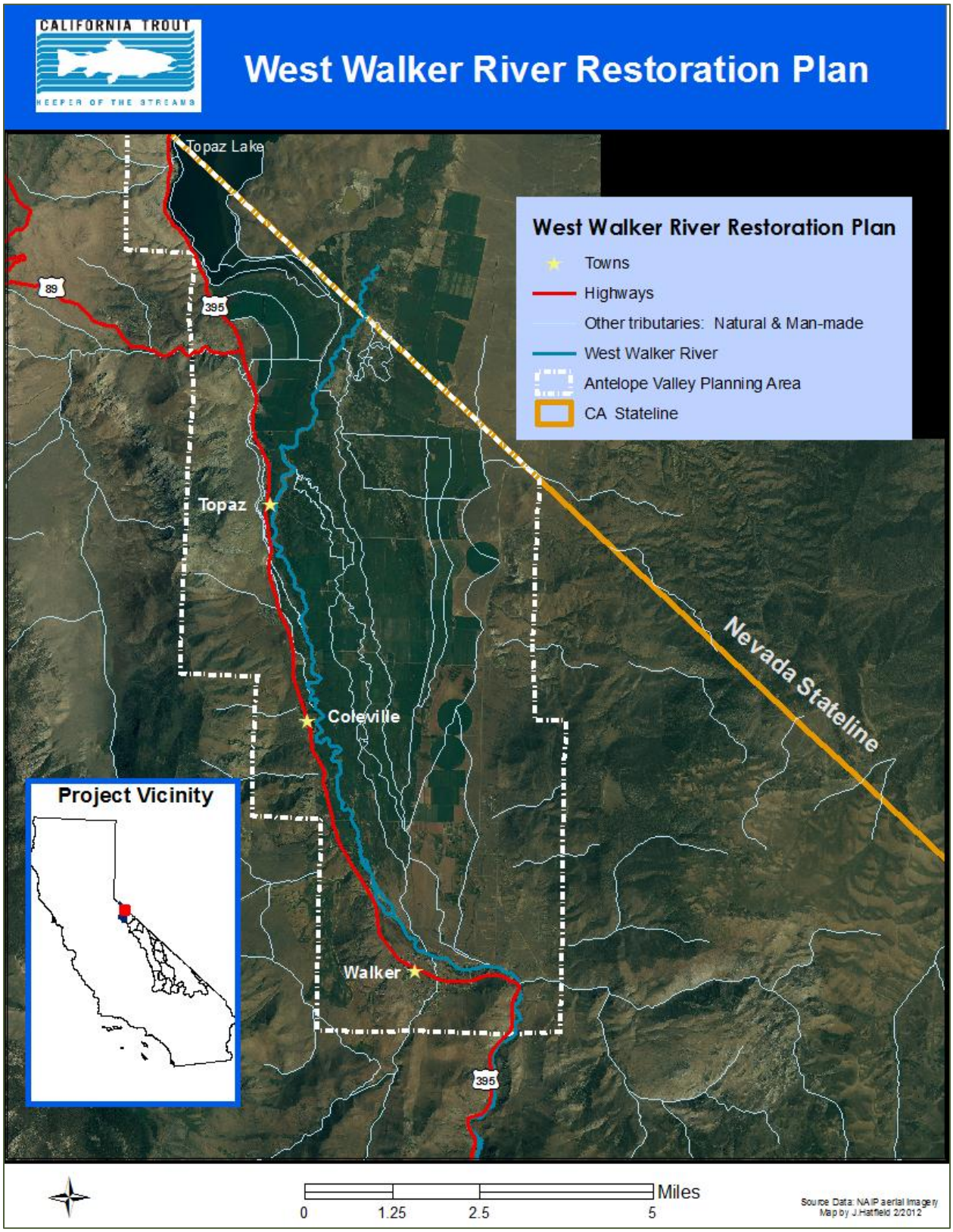
Task 2.B.1 Project administration

2.B.1.1 Coordinate between CalTrout, Inyo-Mono Program Office, Inyo-Mono RWMG, and project consultant to ensure timely completion of planning study
2.B.1.2 Develop and advertise Request for Proposal for project consultant
2.B.1.3 Select project consultant and develop and execute contract for services
2.B.1.4 Ensure CEQA/NEPA compliance
2.B.1.5 Provide progress reports, as well as invoiced expenses and documentation of agency cost share, to meet Prop. 84 Planning Grant requirements

Task 2.B.2 Outreach/information gathering and analysis

2.B.2.1 Convene at least two meetings with local community members to introduce project and gather information specific to issues and needs pertaining to the West Walker River
2.B.2.2 Conduct outreach and information gathering pertinent to the West Walker River with Inyo-Mono RWMG Members
2.B.2.3 Working with local, state and federal agencies, collect and analyze data and information relevant to the evaluation and restoration of the West Walker River within the Antelope Valley

Figure 4: West Walker Planning Study Area



Task 2.B.3 Drafting and dissemination of West Walker River Restoration Plan

2.B.3.1 Draft West Walker River Restoration Plan
2.B.3.2 Present Restoration Plan to Antelope Valley community and Inyo-Mono RWMG
2.B.3.3 Integrate Restoration Plan into updated Inyo-Mono IRWM Plan

Deliverables

- West Walker Restoration Plan for Antelope Valley, including recommendations for Phase II Plan Implementation projects
- Updates to Inyo-Mono IRWM Plan specific to stormwater and flood management based on the information generated in the West Walker River restoration planning process

Planning Study C: Town of Mammoth Lakes Stormwater Management Plan

Introduction

This planning study will develop a stormwater management plan for the Town of Mammoth Lakes. Much of the infrastructure in the Town of Mammoth Lakes (hereafter referred to as "Town"), including roads and drainage facilities, were built by Mono County prior to the incorporation of the Town in 1984. During this time, there was minimal emphasis placed on erosion control, water quality, or facility design. As a result, the Town is now dealing with serious erosion issues, inadequate drainage facilities, numerous flood-prone areas, and a lack of water quality improvements. Several large storm events in 2006 and 2007 highlighted existing problems in the Town and caused excessive erosion of slopes and ditches, flooding of Town facilities and private property, and discharge of sediment and other pollutants to nearby Hot Creek and Mammoth Creek.

As a small community, the Town has limited resources available to address the numerous stormwater, erosion, drainage, flooding, and water quality problems that exist, but the Town is fully committed to tackling the problem. As an example of the Town's commitment to this effort, in 2007, with $70,000 of its own funds (plus hundreds of hours of staff time), the Town commissioned an investigation of stormwater-related issues. The investigation included field evaluations, mapping, and review of existing programs and policies. The project had two important deliverables: an Existing Conditions Report and a Final Recommendations Report. Although focused on only a small portion of the Town because of the limited available funding, the project was highly successful, and the Final Recommendations Report provided the Town with clear direction on suggested management strategies, project considerations, and most importantly, the need for the Town to develop a Stormwater Management Plan.

This planning study is located within the Town of Mammoth Lakes municipal boundary, which is the only incorporated town in Mono County, California. All stormwater from the Town drains into Mammoth Creek and Hot Creek, which are impaired streams but which also house extremely popular fisheries that support the local economy. This planning study will develop policies and methods to control nutrient and sediment loads entering Mammoth Creek and Hot Creek. In addition, a measurement and monitoring plan will be developed to evaluate the long-term implementation of the plan and policies. This plan will include measures that can be modified and used as best management practices by other local and regional stakeholders. Once the Stormwater Management Plan is completed, the Town's Municipal Code will be updated to incorporate requirements for stormwater retention and treatment, and requirements and guidelines to reduce nutrient, point-source, and nonpoint-source sediment pollution.

The Town is a signatory to the Inyo-Mono RWMG, and this plan will be developed and completed in cooperation with this planning group. In addition, the Town will conduct outreach and meetings with the Town Council, Planning Commission, and members of the public to solicit input and provide information and education regarding the importance of managing stormwater pollution for the community and the environment. The development of the Stormwater Management Plan for Mammoth Lakes will help to fill gaps and knowledge in the Inyo-Mono IRWM Plan with regard to stormwater and flood management. The results of this study will be incorporated not only into the Inyo-Mono IRWM Plan but perhaps also other regional water and land use planning documents.

Objectives

The overall goal of this planning study is to move the Town of Mammoth Lakes towards a more proactive approach to managing stormwater, improving water quality, and minimizing the risk of flooding through the development and implementation of a Stormwater Management Plan.

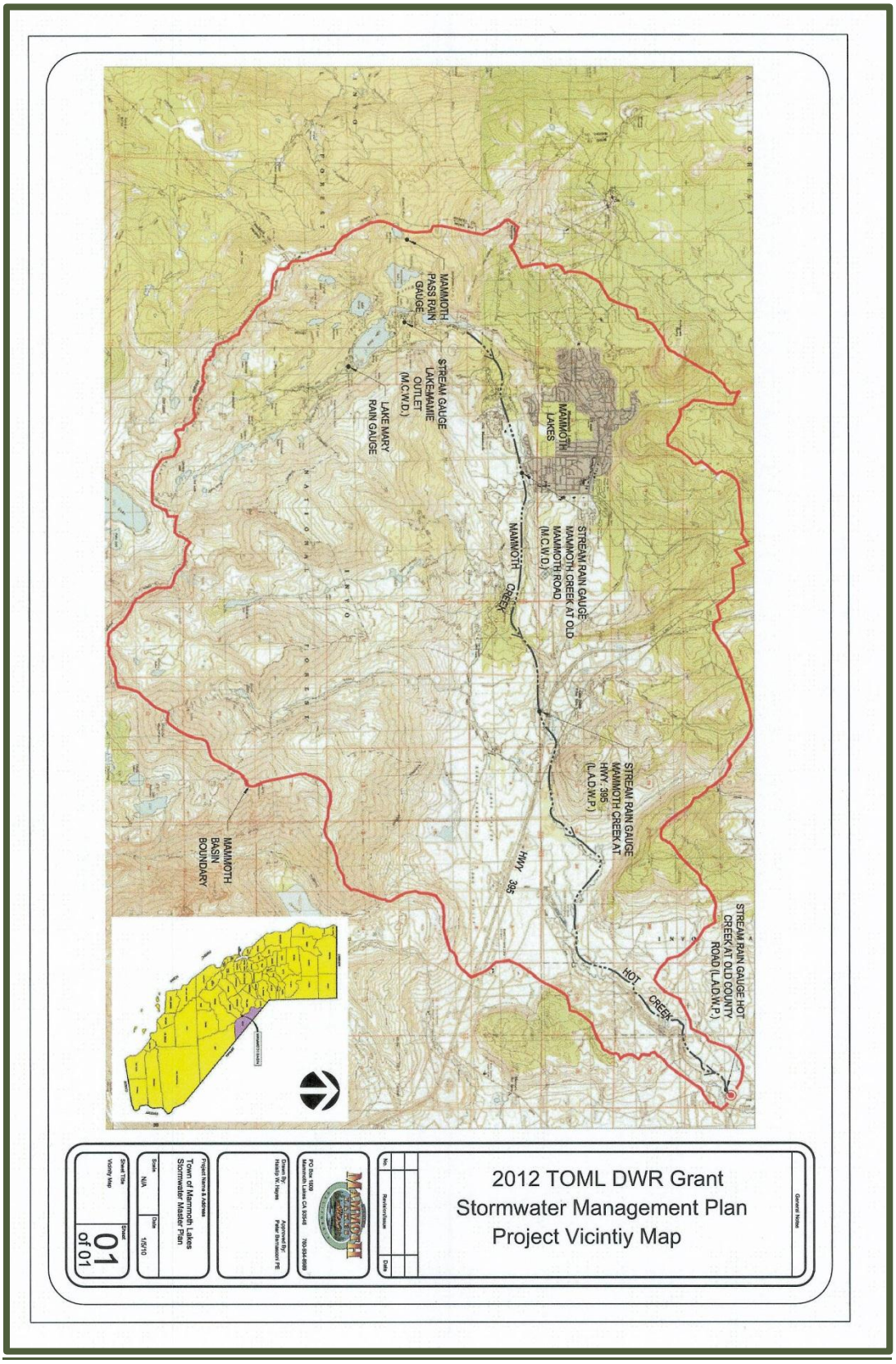
The specific objectives of this study are to:

1. Develop a Stormwater Management Plan that includes provisions for improved management and policy; a Capital Improvement Program (CIP); maintenance and operations; and education and outreach
2. Build upon the work previously completed by the Town, including the integration of the findings and recommendations from the Erosion, Drainage and Flooding Project Final Recommendations Report of 2008
3. Identify, delineate, and prepare to implement CIP projects identified within the Stormwater Management Plan

There are several outcomes that will be developed and implemented as a result of this planning study that are consistent with California Water Code §10562 regarding Stormwater Resource Plans:

1. Public education regarding stormwater pollution
2. Development of local stormwater quality guidelines and local code revisions that address zoning and building activities
3. Development of a retrofit program and policy for existing development to improve stormwater quality
4. Development of an operations and maintenance plan for both public and private developments

Figure 5: Town of Mammoth Lakes Planning Study Area



5. Development of a monitoring, assessment, and reporting plan for both private and public development

As appropriate, these outcomes will be incorporated into the Inyo-Mono IRWM Plan.

Planning Study C. Tasks

Task 2.C.1 Project administration

The Town of Mammoth Lakes will provide progress reports, as well as invoiced expenses and documentation of agency cost share, to the Prop. 84 Planning Grant applicant (California Trout).

Task 2.C.2 Develop Town of Mammoth Lakes Stormwater Management Plan

In order to move the Town towards a more proactive approach to managing stormwater, the Town will hire a consultant to assist with the development of a Town of Mammoth Lakes Stormwater Management Plan. The purpose of the Stormwater Management Plan is to develop management strategies, focused programs, and specific projects for managing stormwater within its jurisdiction. By initiating the development of a Stormwater Management Plan, the Town will ensure that previous, current, and future programs and projects integrate smoothly and maximize the limited resources available to the Town. The plan will also allow the Town to plan for and seamlessly integrate any future stormwater or water quality regulatory requirements developed by the Lahontan Regional Water Quality Control Board and the U.S. Environmental Protection Agency (i.e. NPDES Phase II or Phase III). The Town's year-round resident population is currently below the threshold requirements for a municipal stormwater permit, but completion of this plan will demonstrate the forward-looking nature of the Town ahead of an expected mandate in the future.

The Stormwater Management Plan will include the following sections:

1. Program Management
    a. Overview and background
    b. Climate Change Impacts and Strategy
    c. Presentation of overall stormwater management strategy
    d. Stormwater Finance Strategy & Funding Plan
    e. Coordination with Mammoth Mountain Ski Resort
2. Capital Improvement Program
    a. Water Quality Modeling using SWMM or BASINS
    b. Erosion Control & Water Quality Projects
    c. Drainage Facilities (Storm Drain Management Plan)
    d. Flood Control Projects
3. Operations & Maintenance
4. Public Outreach & Education
5. Construction Site Best Management Plan (BMP) Program
    a. Construction
    b. Maintenance
    c. Monitoring
6. Residential, Commercial and Industrial Retrofit Program
    a. Stormwater Runoff

b. Unpaved driveway, access road, and parking areas
c. Nutrient and Chemical Control

7. Monitoring & Reporting Program

Task 2.C.3 Implement strategic aspects of the Stormwater Management Plan

2.C.3.1 Engage the U.S. Forest Service and the Mammoth Mountain Ski Area (MMSA) in discussions related to ongoing and future plans for erosion control and stormwater management on MMSA property

2.C.3.2 Develop an options memo presenting potential solutions for addressing unmitigated stormwater runoff from commercial, industrial, and residential multi-family properties. The memo will provide a detailed description of each option including benefits, drawbacks, and estimated costs to implement

2.C.3.3 Develop a comprehensive outreach program aimed at educating property owners about the importance of stabilizing bare, compacted, and unpaved driveways, access roads, and parking areas

2.C.3.4 One of the most critical elements to any successful stormwater program is adequate and stable funding. A fiscal analysis and Financial Strategy and Funding Plan for the Town's Stormwater Management Plan will be developed

2.C.3.5 Develop Capital Improvement Program

2.C.3.6 Develop comprehensive GIS-based maintenance plan for Town stormwater infrastructure

Task 2.C.4 Planning study quality control and review

The Town will continue ongoing work to review and coordinate reviews with other agencies including the EPA, Lahontan Regional Water Quality Control Board, Great Basin Air Pollution Control District, Mono County, and Department of Water Resources.

Task 2.C.5 California Environmental Quality Act

The Town will prepare an appropriate environmental checklist and documentation for a Negative Declaration that will enable the Town to adopt the completed Mammoth Lakes Stormwater Management Plan and related policy documents so they can be codified in the local Municipal Code.

Deliverables:

- Draft & Final Stormwater Master Plan
- Draft & Final Stormwater Capital Improvement Program
- Draft & Final Stormwater Finance Strategy & Funding Plan
- Draft & Final Stormwater Operations & Maintenance Plan
- Draft & Final Framework for Commercial, Industrial and Residential Retrofit Program
- Draft & Final Monitoring, Assessment & Reporting Plan

Planning Study D: Inyo/Mono Watersheds Invasive Plant Inventory

Introduction

This study will undertake a comprehensive assessment of current invasive plant species occurrence within seven Inyo and Mono County watersheds. Intact native plant communities are a critical component of properly-functioning watersheds, promoting many positive attributes such as enrichment of wildlife habitat, normal fire regimes, and better water quality and quantity (Donaldson, 1997). Invasive plants (also here called "weeds") threaten these native plant communities and thus reduce certain advantages that watersheds gain from healthy riparian conditions. Invasive plants degrade a watershed's ability to retain surface water and ground water, while decreasing water quality via intensification of sediment loading through erosion and other processes (Chambers, 2008). Alteration of natural fire regimes by these invaders increases runoff and erosion as well.

In addition to concerns related to water quality and quantity, weeds compromise the flood-holding capacity of watersheds (Donaldson, 1997). Invasive plants hinder the ability of a watershed to retain water during flooding events. This lack of retention often leads to increased streambed destruction during conditions of high runoff, resulting in streambank erosion or failure, as well as downstream consequences such as decreased water quality and flooding. Water quality issues that can result include increased sediment loading and altered nutrient cycles. Water quantity is affected by a watershed with degraded retention capacity. Obtaining data on invasive plant populations for mitigation and planning fosters healthy native riparian conditions and improves a watershed's natural ability to manage floodwater and stormwater events.

A required component of successful watershed management is consideration and mitigation of invasive plant threats. Resource managers must know of the presence of these weeds for planning, and land managers require a means by which to prioritize projects to maximize limited resources available for protecting and restoring watersheds. Proper planning protects natural resources and wildlife habitat, including that for threatened and endangered species. Recreational planning must also account for the potential of invasive plant spread and how to respond to those threats if they occur.

The seven watersheds to be assessed through this study include: East Walker River, West Walker River, Owens River, Amargosa, Deep Springs, Fish Lake, and Mono Basin. Communities involved with and benefitting from this inventory include (DACs, based on 2000 Census Median Household Income data are indicated with an asterisk[*]; communities in **bold** are not recognized as DACs based on 2000 data but are likely candidates for DAC status):

- Benton*
- Big Pine*
- Bishop*
- **Bridgeport**
- Chalfant*
- Coleville*
- Hammil*
- Independence*
- Keeler*
- **Lee Vining**
- Lone Pine*
- Mammoth Lakes
- **Oasis**
- **Olancha**
- Shoshone*
- Tecopa*
- Topaz*
- Walker*
- Wilkerson

Species for inclusion in the survey are those specifically selected by the Eastern Sierra Weed Management Area (ESWMA) group and listed in its strategic plan as regionally important. These species are listed in Table 3, which includes California Department of Food and Agriculture (CDFA) and California Invasive Plant Council (Cal-IPC) ratings.

Table 3: ESWMA Species of Concern

Species	CDFA Rating*	Cal-IPC Rating**
Perennial pepperweed (*Lepidium latifolium*)	B	High
Russian knapweed (*Acroptilon repens*)	B	Moderate
Spotted knapweed (*Centaurea maculosa*)	A	High
Halogeton (*Halogeton glomeratus*)	A	Moderate
Scotch thistle (*Onopordum acanthium*)	A	High
Camelthorn (*Alhagi maurorum*)	A	Moderate
Dalmatian toadflax (*Linaria dalmatica*)	A	Moderate
Yellow starthistle (*Centaurea solstitialis*)	C	High
Canada thistle (*Cirsium arvense*)	B	Moderate

*CDFA ratings range from “A” (high threat), to “B” (moderate threat), to “C” (low threat)
**Cal-IPC ratings range from “High” (severe impacts, high rate of spread), to “Moderate” (substantial impacts, moderate rate of spread), to “Limited” (minor impacts, low rate of spread)

Taking into account the linkages between invasive plant species, watershed health, water supply and quality, and flood control, the importance of a comprehensive regional inventory of invasive plant species is obvious. Without baseline invasive plant data, the health of regional watersheds cannot be assessed properly. The Inyo-Mono IRWM Program seeks projects that will fill regional planning information gaps. The addition of these data into the Inyo-Mono IRWMP knowledge base will allow proponents of future planning and implementation projects to review potential watershed consequences from invasive plant infestations within the Inyo-Mono planning region and determine how those consequences may impact their project. Given these data, future projects can also analyze how to mitigate any potential weed problems. Results from the invasive plant inventory will be incorporated into the appropriate sections of the Inyo-Mono IRWM Plan.

This planning study will include initial meetings with members of the ESWMA to assess which data are current and what survey deficiencies exist. Members of the ESWMA that may participate in this process include:

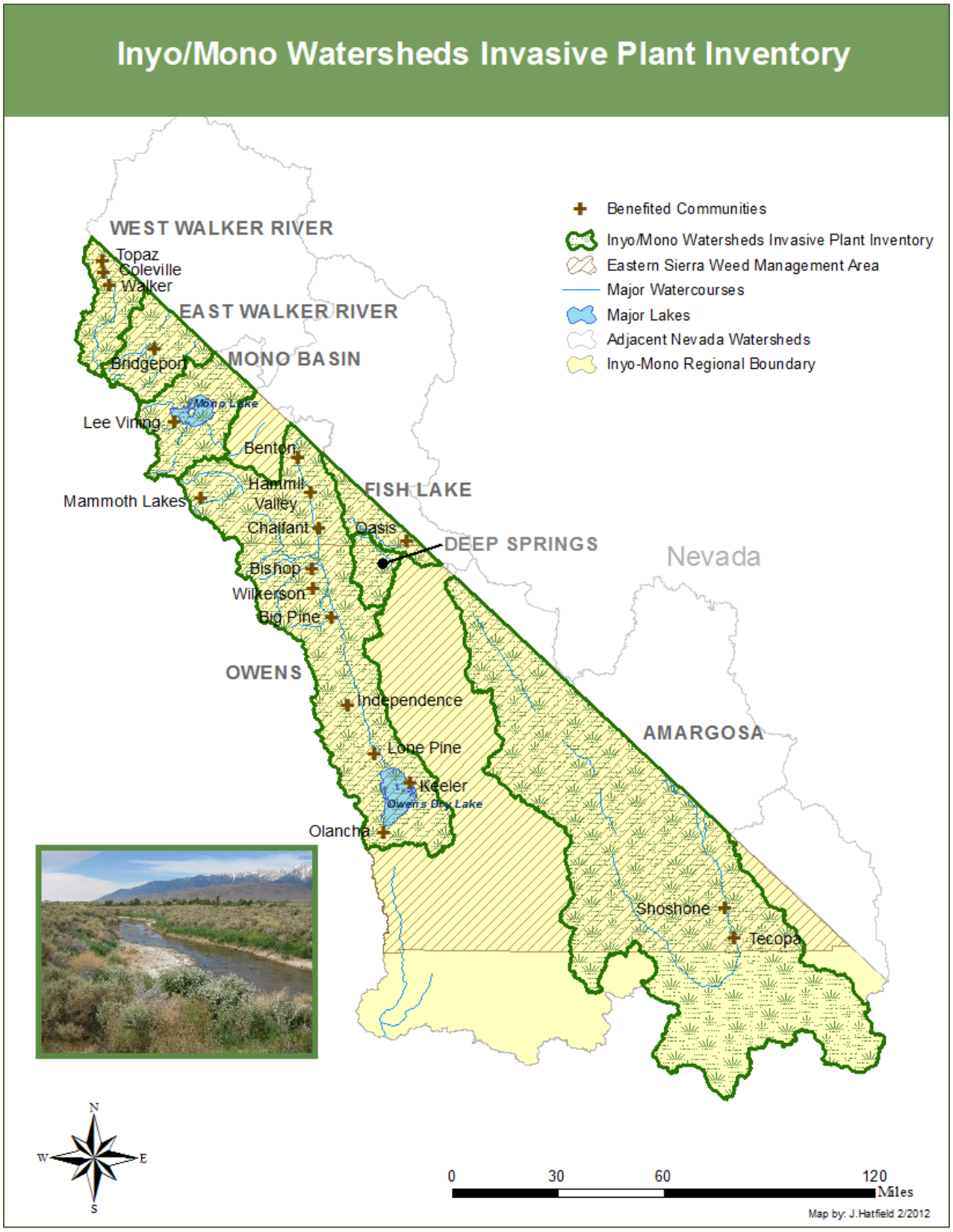
- California Department of Food and Agriculture
- Inyo/Mono Counties Agricultural Commissioner's Office
- City of Los Angeles Department of Water and Power
- Inyo County Water Department
- Bishop Paiute Tribe Environmental Management Office
- California State Parks
- Bureau of Land Management, Bishop Field Office
- Bureau of Land Management, California Desert District
- Inyo National Forest
- Toiyabe National Forest
- Natural Resource Conservation Service
- CalFire
- Inyo/Mono Resource Conservation District
- Inyo/Mono Counties' Cattleman's Association
- California Department of Transportation, District 9

Surveys will then be used to evaluate data-deficient areas and regions of likely spread within the watersheds. The Inyo/Mono Agricultural Commissioner's Office (AgComm) will organize this information in a standard geodatabase for future use.

As a member of the ESWMA group and the current database administrator, AgComm can acquire and compile data from various sources. AgComm can then disseminate these data to agencies or individuals, allowing future planning efforts and project proponents to assess potential invasive plant consequences to mitigate the effects of these species on project success. AgComm also has experience managing several other GIS projects (pesticide permitting database, pest exclusion database, etc.).

All communities within the surveyed watersheds, including DACs and Tribes, will benefit from this planning study. Proper planning of future projects will minimize negative effects of weed issues on the local and regional recreation and agriculture industries, which together comprise nearly all of the local economic input. Higher future invasive plant management costs may result from the current, and incomplete, data set. Proper data can assist local agencies and groups plan and prioritize invasive plant abatement projects, saving these agencies and groups future resources. Data from this inventory can also assist in fire hazard identification, helping local communities plan for prevention of and recovery from wildland fires. Additionally, this planning study will employ local residents, adding jobs and economic input to the region. These jobs, coupled with support from and protection of the two largest local economic drivers, will benefit greatly the economic future of DACs and Tribes.

Figure 6: Invasive Plants Inventory Planning Study Area



Objectives

The objectives of the Inyo/Mono Watersheds Invasive Plant Inventory are to:

1. Complete a survey of selected invasive species of regional importance, using existing data, interagency cooperation, and field surveys
2. Perform assessment of existing data to confirm accuracy

Planning Study D. Tasks

Task 2.D.1 Project organization and administration

2.D.1.1 During this phase, AgComm will conduct one or more meetings with local land management agencies via the ESWMA group. These meetings will (1) identify any known deficiencies that exist in Inyo and Mono Counties with regards to invasive plant population data, and (2) prioritize survey efforts. High priority will be given to areas of unknown status with a high potential for infestation as identified in (1) above, followed by known populations ranked by ESWMA members using the following attributes (not in order of importance):

- Age of existing data
- Species
- Habitat sensitivity
- Presence of threatened and endangered species
- Proximity to movement conduits such as roads, trails, or streams
- Likelihood of spread
- Management potential

2.D.1.2 This portion of the planning study allows AgComm to (1) hire personnel needed to complete the mapping of the prioritized areas, (2) acquire data collection equipment needed for surveys, and (3) train personnel in the use of data collection and other equipment.

2.D.1.3 AgComm will provide progress reports, as well as invoiced expenses and documentation of agency cost share, to the Prop. 84 Planning Grant applicant (California Trout).

Task 2.D.2 Data collection

During this phase, survey workers will assess zones designated in Task 2.D.1.1 as unknown but high in potential as infestation areas. These data will be collected first, because gaining data about these regions will contribute to the area knowledgebase most significantly. After collecting the most vital data, survey workers will continue efforts to include other areas identified by the ESWMA as important, but known to be infested. If time and resources permit, personnel will survey areas with lower priority for data collection, such as large known populations or infestations occurring in remote areas with little threat of spread.

Data collection activities will include comprehensive surveys of watersheds on foot, with point data gathering using handheld GPS units to indicate the location of weed infestation and presence of invasive species. Other data will include abundance and general comments if appropriate or helpful.

Task 2.D.3 Data assessment

Field data will be entered into a database and organized during this phase. Quality control assessments will validate the data collected in the field.

Task 2.D.4 Data dissemination and publication

This final phase will include publishing the collected, organized, and assessed data, and providing them to interested agencies and the public through the internet and meetings. Data will be made publicly and easily accessible on both the AgComm website and the Inyo-Mono IRWMP website. Data will be presented in standard formats such as ESRI shapefile format and GoogleEarth .kmz format.

Deliverables

- Current and comprehensive database of selected invasive plant occurrence data for the East Walker River, West Walker River, Owens River, Amargosa, Deep Springs, Fish Lake, and Mono Basin watersheds
- Integration of database into the Inyo-Mono IRWM planning process, and database publication in a format useable by both agency and public users

References

Chambers, J.C. (2008). Invasive species and the great basin. *Collaborative management and research in the Great Basin – examining issues and developing a framework for action.* Retrived from http://www.fs.fed.us/rm/pubs/rmrs_gtr204.pdf

Donaldson, S.G. (1997). Flood-borne noxious weeds: impacts on riparian areas and wetlands. *1997 California Exotic Plant Council symposium proceedings.* Retrieved from http://www.cal-ipc.org/symposia/archive/pdf/1997_symposium_proceedings1945

This page intentionally left blank

Chapter 3: *Enhance integration of climate change information into the Inyo-Mono IRWM planning process*

Introduction

Climate change is becoming an increasingly recognized topic of concern and focus for water resources management in California. Two recent examples of this awareness are the release of the "Climate Change Handbook for Regional Water Management" and the appointment of a DWR Climate Change Technical Advisory Group (CCTAG). Inyo-Mono IRWM Program Staff have been and will continue to be directly involved in both of these efforts (as a reviewer of the Handbook and a member of the CCTAG).

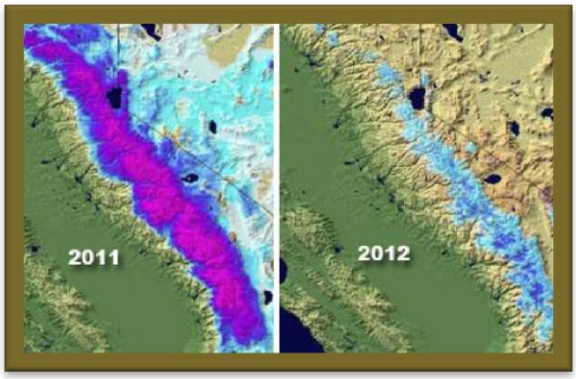


Image courtesy of National Weather Service

While the Round 1 Planning Grant award is being used to more fully incorporate climate change into the Inyo-Mono IRWM Plan, we will not be able to fully address the enhanced climate change Plan standard until revisions to the Prop. 84 Plan Guidelines are released. Therefore, the work in the Round 2 Planning Grant will focus on proactively meeting this expanded standard as well as taking next steps with respect to a quantitative water-related greenhouse gas emissions inventory for the region. To further our goal of responding to climate change, an analysis exploring the various relationships between water and energy in the region will be completed. The **objective** of this work is to more fully explore climate change information and analyses for the Inyo-Mono region to (1) expand climate change response actions and (2) provide climate-related education, resources, and technical expertise to stakeholders within the region.

Chapter 3 Tasks

Task 3.1 Climate change state of knowledge assessment

The Inyo-Mono Program Office will work with the RWMG and other stakeholders in the region to assess the state of knowledge regarding climate change, both on the regional level and the community level. This effort will take the form of focused meetings and workshops to discuss views on climate change and provide up-to-date information on the science and policy related to climate change both in California and nation-wide.

Task 3.2 Inventory of tools and models

The Inyo-Mono Program Office will conduct an inventory of existing tools and models relevant to climate change and natural resources management being used in the region. However, given the limited resources available in the Inyo-Mono region, it is known that the use of quantitative and qualitative analysis tools has been minimal to date. Therefore, this task will also include a survey of available tools and models being used elsewhere that

would be appropriate to employ in the Inyo-Mono region.

Task 3.3 Prioritizing vulnerabilities and data gathering

Responding to the expanded climate change Plan standard, and building upon the vulnerability assessment completed through the Round 1 Planning Grant, the Inyo-Mono RWMG will work to prioritize these vulnerabilities through its consensus decision-making process. As a second step, the Inyo-Mono RWMG will identify information gaps related to the prioritized vulnerabilities and will develop a plan and methodology to enhance data gathering and analysis.

Task 3.4 Greenhouse gas emissions inventory and water/energy nexus

Building on the work performed in the Round 1 Planning Grant to identify water-related sources of greenhouse gas emissions, the Inyo-Mono RWMG will perform a quantitative assessment of water-related GHG emissions in the region. In addition, Program Staff will research the water/energy nexus concept and explore ways to apply the concept in the Inyo-Mono region. Finally, we will examine opportunities to reduce energy use and greenhouse gas emissions related to water management in the region.

Task 3.5 Conference presentations and CCTAG participation

Program Staff will present findings and lessons learned from the vulnerability analysis, vulnerability prioritization process, and water/energy nexus analysis to a state-wide conference or workshop and to other IRWM regions as a case study for performing these tasks in a rural/mountain/headwaters/desert environment. As a formal member of the DWR Climate Change Technical Advisory Group (CCTAG), Program Staff will contribute to the CCTAG efforts on a quarterly basis. Program Staff will also disseminate information to the Inyo-Mono RWMG based on CCTAG meeting results and other achievements.

Deliverables

- Report on the state of knowledge of climate change in the Inyo-Mono region
- Report detailing the existing tools and models being used in the region or available for use in the region
- Plan to enhance data gathering and analysis based on prioritized list of vulnerabilities
- Quantitative assessment of greenhouse gas emissions in Inyo-Mono planning region
- Analysis of the water-energy relationship within the Inyo-Mono IRWM region
- Presentations given at conferences, workshops, or to other IRWM regions

Chapter 4: *Information/data management, Geographic Information Systems (GIS), and the Inyo-Mono IRWMP website*

Introduction

Recent technological advancements have benefitted the Inyo-Mono IRWM region by providing a variety of inexpensive and user-friendly tools to local and regional stakeholders. Recent improvements to the Inyo-Mono IRWMP website (www.inyomonowater.org) and the acquisition of in-house spatial analysis tools are evidence of advances in these more user-friendly technologies. While significant progress has been made since the inception of the Inyo-Mono Program with respect to such tools, there is an opportunity to improve upon the current status and begin to bridge data gaps that still exist. Moving forward, websites and spatial analysis tools will become increasingly important in many fields, including that of natural resources management. Acknowledging these uses, the Inyo-Mono IRWM Program will continue to foster capacity building in these areas.

The **objective** of GIS-related work in the Round 2 Planning Grant is to continue acquiring important spatial data in order to enhance the internal GIS capacity of the Inyo-Mono IRWM Program. In its infancy, the Inyo-Mono IRWM Program had to rely on RWMG Member groups to provide in-kind GIS assistance based on their available time and resources. Through the Round 1 Planning Grant, the Inyo-Mono RWMG has been able to start building in-house GIS capabilities, including data acquisition and organization, map making, and targeted spatial analyses. This work is continuing through the DAC pilot program, where GIS is being used specifically to aid in the identification of and assistance to DACs.

Currently, the goal of the Inyo-Mono website is to provide an increasingly valued tool to regional stakeholders by facilitating information transfer in the most efficient manner possible while inviting public interest, building internal web development and maintenance capacity, and using State funds in the most responsible manner. Through the Round 1 Planning Grant, the Inyo-Mono website was overhauled in appearance and content. This effort greatly improved the navigability of the website as evidenced by feedback from the RWMG and other stakeholders. The **main objective** of enhancing the website potential as part of Chapter 4 is to further improve the functionality of the website while updating and maintaining website content.

Chapter 4 Tasks

Task 4.1 GIS and spatial analyses

The Program Office will continue to acquire important spatial data for the Inyo-Mono IRWM planning region as well as perform a gap analysis of spatial data needs. The emphases in this task will be improvements to data quality and metadata according to Inyo-Mono Data Management Plan standards as well as the identification of opportunities to acquire additional regional spatial data and/or generate original data.

Task 4.2 Maintaining and updating Inyo-Mono Program website

Website content, such as the calendar of events, relevant documents, news, and meeting notes, will be updated and maintained in a timely manner. Additional tools will be added to the Inyo-Mono website as technology and finances permit, and may include, among other things, online project upload forms and online mapping capabilities.

Deliverables

GIS

- Report on gaps in spatial data and plan for acquiring additional data or generating new data
- List of additional spatial data acquired and original data generated
- Report on status of improving data quality and metadata

Website

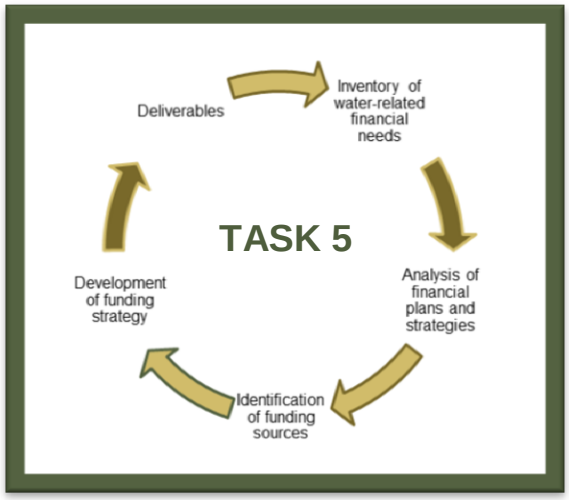
- Enhanced website content and tools
- Regularly updated materials posted to the website

Homepage: *www.inyomonowater.org*

Chapter 5: *Sustainable funding plan for the Inyo-Mono IRWM Program*

Introduction

It is recognized that future funding to support Integrated Regional Water Management efforts in California is uncertain. Moreover, based on work completed thus far by the Inyo-Mono RWMG, it is understood that there are significant funding needs to support high-priority implementation projects, regional capacity building, and programmatic activities necessary to ensure the long-term viability of the Inyo-Mono RWMG. Thus, it is imperative that a sustainable financial plan be developed to address short- and long-term funding needs of the region. To address future uncertainties and critical funding needs, the **objective** of this work is to develop and begin to implement a short- and long-term financial plan that responds to regional needs.



Chapter 5 Tasks

Task 5.1 Inventory of water-related financial needs

A comprehensive inventory of water resources-related financial needs of Inyo-Mono RWMG Members and other stakeholders in the region will be conducted. To accomplish this inventory, outreach to Members and stakeholders will be undertaken to assess and compile current financial needs related to priority water-related issues.

Task 5.2 Analysis of financial plans and strategies

The Program Office will analyze various models of financial plans and associated strategies and will determine which models would be appropriate to employ in the Inyo-Mono IRWM region. This analysis will include a review of various and diverse financial management plans developed for public agencies, foundations, for-profit and non-profit organizations, volunteer organizations, and other IRWM regions.

Task 5.3 Identification of funding sources

The Inyo-Mono RWMG will identify short- and long-term funding opportunities to support water-related needs within the Inyo-Mono planning region. This process will include identification of local, state, and federal, as well as private sector funding sources. A database of funding opportunities will be established and made available on the website.

Task 5.4 Development of funding strategy

The RWMG will undertake the development and initial implementation of a funding strategy and financial plan based on the analysis from Tasks 5.1-5.3. To complete this task, information derived from Tasks 5.1-5.3 will be synthesized, and from there, a sustainable short- and long-term financial plan will be developed.

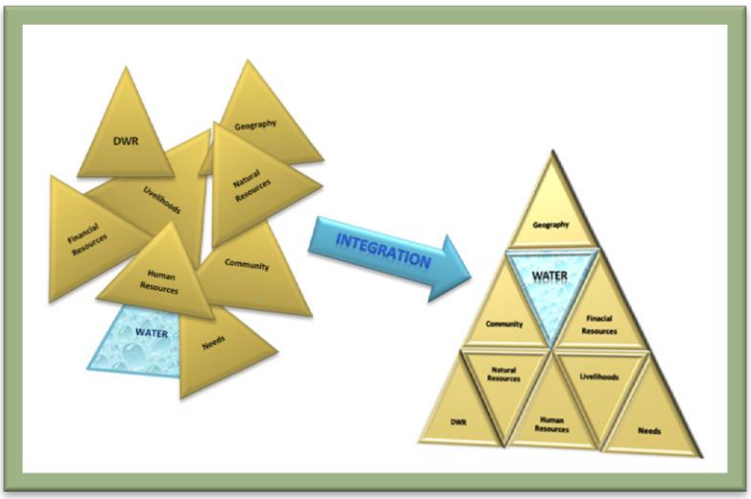
Deliverables

- Assessment of financial plans relative to the needs of the Inyo-Mono RWMG
- Inventory of funding required to address water resources-related needs of Inyo-Mono RWMG Members and stakeholders
- Comprehensive database of funding sources made available on the website
- Development and initial implementation of a comprehensive financial plan for the Inyo-Mono RWMG

Chapter 6: *Integration and updating the Inyo-Mono IRWM Plan to meet Plan Standards*

Introduction

The Inyo-Mono IRWM region is diverse in its geography, political jurisdictions, resources, and livelihoods: the region itself comprises 11% of California's land area and includes four counties, multiple watersheds and groundwater basins, and complex geography and topography, from the crest of the Sierra Nevada to over three million acres of lowland deserts. This region is home to diverse array of natural and human communities. As such, grappling with the meaning of "integration" for our region and how best to functionally move towards a more integrated IRWM planning process is challenging. In response to this challenge, the Inyo-Mono RWMG will continue to consider ways to incorporate the concept of integration into regional planning.



The Webster's New World Dictionary definition of "integrate" is "1. to make or become whole or complete, 2. to bring (parts) together into a whole." While our goal cannot be to create a "whole" from our region, given its diversity, we have strived to create unity with respect to water planning goals. Moving forward, the Inyo-Mono RWMG must develop more creative ways of thinking about integration and how to operationalize the concept given the unique characteristics and needs of the region. **A primary objective of Chapter 6** is to build on our knowledge of common issues and concerns and develop new concepts of integration for the Inyo-Mono region, resulting in opportunities that create synergies and more effectively respond to regional needs. We expect that work within this chapter will also result in opportunities for integrated Implementation projects. Within this work, we will analyze various concepts behind integration, how these concepts have been applied in other regions, and how integrated regional water management within California can be scaled up to respond to the needs of those sharing critical water resources at the multi-state level. **A second objective of this effort** is to use the results from the work in the previous five chapters, as well as the previous analysis of integration, to update the Inyo-Mono IRWM Plan to make it more effective for water planning in the region and to better meet the Proposition 84 Plan Standards.

Chapter 6 Tasks

Task 6.1 Analysis of integration options for the Inyo-Mono IRWM Program

Using results from previous outreach efforts as well as the recently-updated Inyo-Mono

master project list, Program Staff will analyze various models of integration appropriate for the Inyo-Mono region. Options will be presented to the Inyo-Mono RWMG for decision as to how to better incorporate integration, including integrated projects, into the updated IRWM Plan. These options for integration will also be used to shape future Implementation grant proposals.

Task 6.2 Presentation of integration options

Based on the outcomes of Task 6.1, information will be presented to DWR regarding alternative methods of incorporating "integration" into IRWM Plans, particularly for widespread, largely rural regions.

Task 6.3 Inyo-Mono IRWM Plan updating to meet Plan Standards

The results from Chapters 1-5, as well as those from Tasks 6.1 and 6.2, will be incorporated into the Phase II Inyo-Mono IRWM Plan. Rather than a complete revision of the Plan, this new material will simply be used to update the Plan. Program Staff and key RWMG Members will lead the update process, allowing time for the RWMG to review.

Deliverables:

- Report detailing models of integration used by other IRWM regions and in other integrated resource management efforts
- Presentation on integration models provided to DWR
- Updated Inyo-Mono IRWM Plan

Chapter 7: *Additional IRWM Plan Work*

Although the work proposed in Chapters 1-6 of this Planning Grant are intended to produce a Plan Standards-compliant Inyo-Mono IRWM Plan, the Inyo County Department of Public Works has developed two additional planning studies that will be undertaken contingent upon funding from Inyo County and other local, State, and Federal sources, and that will help to fill in gaps within the Inyo-Mono IRWM process by addressing infrastructure planning.

1) Inyo County Water Mains Database

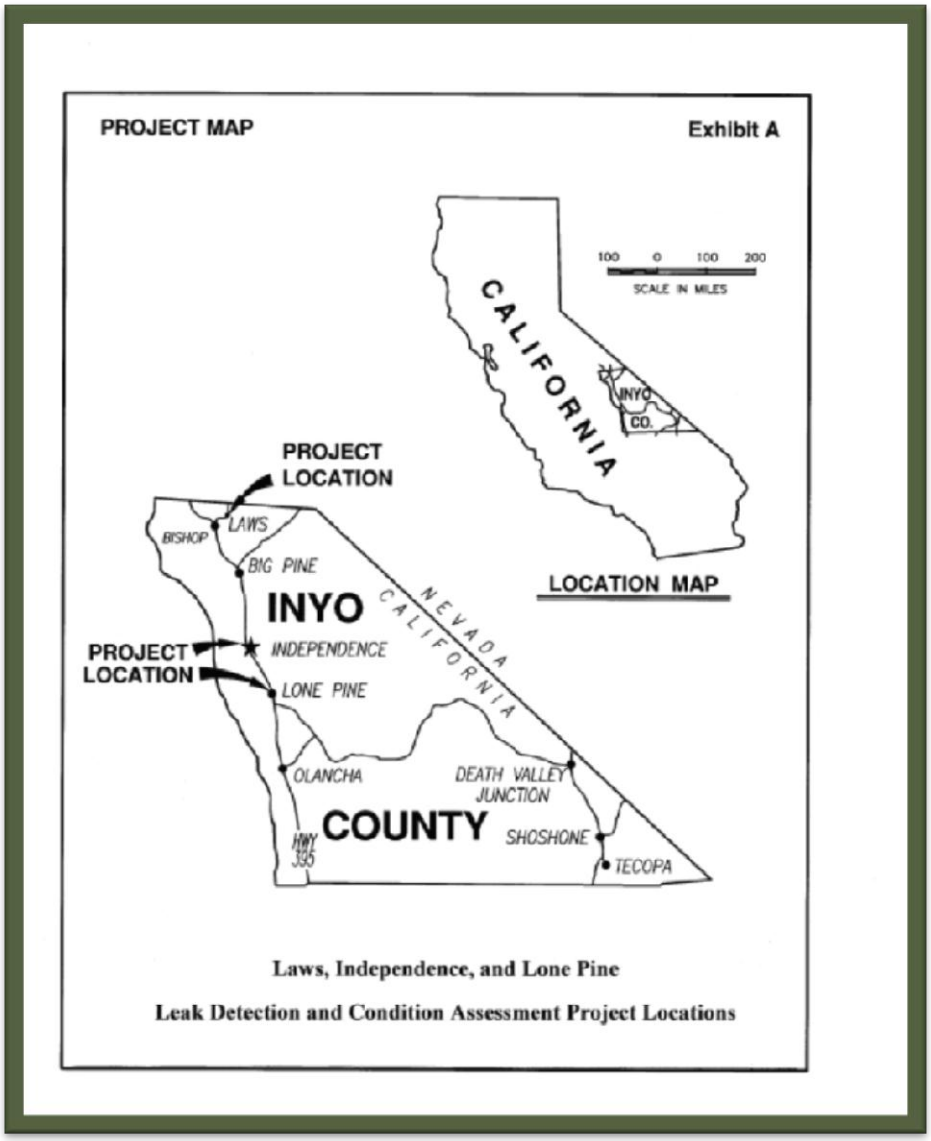
Introduction

In March, 2010, the California Rural Water Association provided training to Inyo County employees in leak detection and water accountability. The training was funded by Department of Water Resources' Division of Water Use Efficiency and resulted in leak detection efforts for a few select mains within the disadvantaged communities of Laws, Independence, and Lone Pine. That selection was made based upon the age of mains, corrosivity of soil adjacent to mains, and presence of electrical transformers on power poles adjacent to installed mains. The next step is to determine the most advantageous and representative mains upon which to perform leak detection and condition assessment. One primary outcome of this leak detection and condition assessment study will be a water mains database that will incorporate water main age, material, size, presence of leaks, past repairs, etc. This database will conform to a national water mains database currently being developed by the American Water Works Association Research Foundation (AWWARF 2012). AWWRF's database is referenced numerous times in a USEPA report that called for the establishment of these kinds of databases and stated that a similar database developed in the United Kingdom has become an invaluable planning tool for utilities.

Once the database is developed for Laws, Independence, and Lone Pine, it can serve as a repository for the same information to be included by other stakeholders in the Inyo-Mono region as they prepare capital improvement plans and determine the expected life that mains may experience prior to replacement. This information will thus positively impact the financial and socioeconomic status of local residents in these communities by utilizing more advanced technologies to develop a water mains replacement schedule. Inyo County will benefit by achieving an educated estimate of the actual condition of the installed infrastructure. This will assist with Capital Improvement Planning, a necessary component of a much needed rate study and associated rate increase. A rate increase will be more palatable and acceptable to community residents if the Capital Improvement Plan is based upon objective information. This project will also favorably benefit and impact the local Community Services Districts (CSDs) that are deciding whether to seek transfer of local water systems to their control. CSDs will know better the condition of their water mains, which will assist them in their decision-making processes regarding water system ownership.

All data, graphs, and reports generated from this project will be made available to the Inyo-Mono RWMG and others via the internet.

Figure 7: Inyo County Water Mains Database Planning Study Area



Objectives

The objectives of this database development are to:

1. Produce a water mains database for use by Inyo County and other stakeholders in the Inyo-Mono planning region
2. Provide guidance to Inyo County on Capital Improvement needs in preparation of a necessary water rate study
3. Provide data directly to Community Service Districts within the region considering acquisition of a County-operated system
4. Provide the public a more accurate understanding of the condition of water mains in their communities
5. Provide guidance to Inyo County on the preparation of Water Master Plans for the three town water systems
6. Provide an estimation of the number of leaks and integrity of the water systems

Tasks

Task 1 Project administration

This task will include soliciting and awarding contracts to a consultant and a detection/ assessment provider, as well as general project administration.

Task 2 Leak detection and condition assessment

This task will be comprised of fieldwork to perform leak detection and condition assessment on selected water mains in Laws, Independence, and Lone Pine. This will include work from Inyo County staff to provide necessary documentation to the consultants as well as assisting in fieldwork. Finally, the consultant will be responsible for providing a final report detailing the findings of the leak detection and condition assessment, as well as the AWWARF-consistent database. This report will assist the Inyo County Department of Public Works rate setting, water master planning, potential transfer of the water systems to local control, etc. The water mains database will be made available to the Inyo-Mono RWMG and other members of the public through the Inyo-Mono IRWM website.

Budget and Schedule

It is estimated that the total cost of this database development project will be approximately $185,000. This project will be funded contingent upon available funding from Inyo County and other sources. Once started, the project will take approximately 24 weeks to complete.

Deliverables

- Request for Proposals to secure consulting services to determine most appropriate technology to utilize and the most representative mains to analyze
- Request for Proposals to secure leak detection and condition assessment services
- Final report with analysis of data
- Completed database presented to Inyo-Mono RWMG

References

"U.S. Beta Testing of the UKWIR National Mains Failures Database" American Water Works Association Research Foundation, Project #4195.

2) Bishop Creek Sewer System Master Plan

Introduction

The Inyo County CSA-2 (County Service Area #2) sewer collection system and the U.S. Forest Service/Inyo National Forest Bishop Creek sewage treatment plant and ponds are in dire need of renovation because of continued seepage, recurring blockages, infiltration inflow, and overall system aging. These systems serve residences and U.S. Forest Service campgrounds in the Bishop Creek drainage. These conditions have created a situation where costs for system maintenance, operations and effluent treatment are high and also create a potential for significant environmental impacts through seepage and spillage of sewage into Bishop Creek. This watershed provides water for domestic consumption indirectly to the City of Bishop, Bishop Paiute Tribe, and the City of Los Angeles via the Los Angeles Aqueduct system. Spillage into

Bishop Creek could also impact recreational fishing opportunities if there is a stream closure related to such spillage.

The sewage collection system has not been evaluated since the late 1970s, and no accurate plans for the collection system exist. The study will result in the completion of a master plan for the Bishop Creek sewer system based on evaluation of the current conditions of the system's infrastructure. The evaluation will consist of survey mapping and measurements of the entire system as well as performing a video inspection of the main lines to document the existing conditions and problem areas in the sewer mains and treatment plant. Following the mapping and measurement portion of the evaluation, plan and profile drawings will be created and used to develop recommendations for the rehabilitation of the sewer system and plant. The master plan will provide a framework for the operation and maintenance of the collection, transmission, and treatment facilities as well as recommendations for system replacements and upgrades. It is thought that this project can lead to the design of a more energy-efficient wastewater treatment plant, which would reduce operational costs, electricity consumption, and greenhouse gas emissions. The construction of a redesigned treatment plant would also create local jobs and directly benefit the local economy. The eventual goal of this effort is to provide protection and enhancement of the water quality of Bishop Creek by ensuring that leachate and spillage from the sewer system does not enter the groundwater or the flowing channel of Bishop Creek.

The Bishop Paiute Tribe has indicated support for the proposed project because the Tribe obtains irrigation water and groundwater from this watershed. This will also support meeting Lahontan Regional Water Quality Board standards by reducing the potential for Regional Board violations.

A consulting engineering firm specializing in sewer system evaluations will be selected to make recommendations for treatment plant options and equipment upgrades and/or replacements at the plant; collection and conveyance system upgrades, replacements or repairs; and a rate analysis.

Objectives

The objectives of this planning study are to:

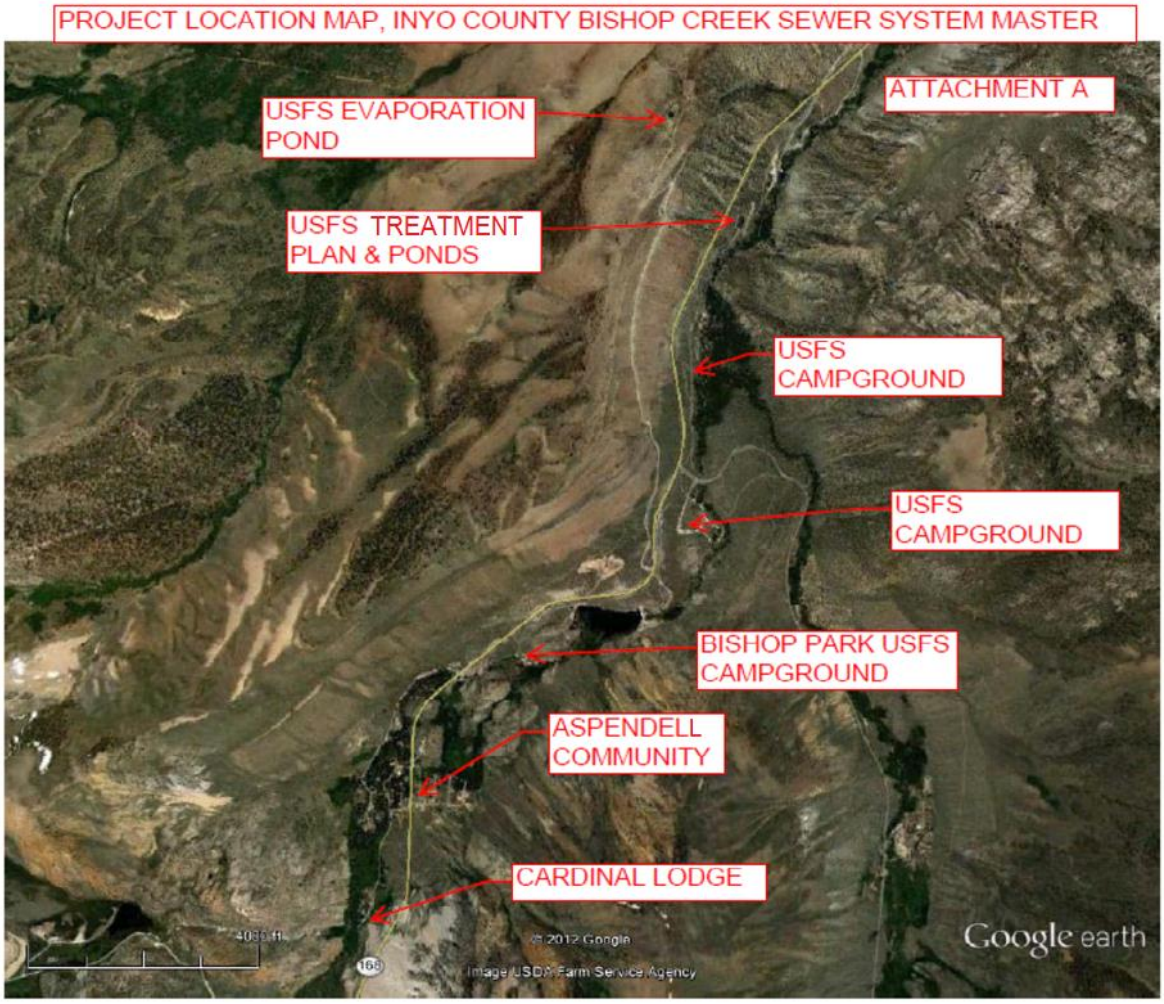
1. Develop a sewer system master plan specific to Bishop Creek
2. Provide model template for other wastewater/sewer system plans in the Inyo-Mono planning region

Tasks

Task 1 Selection of engineering consulting firm

This task will be comprised of obtaining approval from the Inyo County Board of Supervisors and the U.S. Forest Service to bid for engineering consultant services, advertising the Request for Proposals, evaluating applications, and selecting an engineering consultant firm.

Figure 8: Bishop Creek Sewer Master Plan Study Area



Task 2 Conduct evaluation and study of Bishop Creek sewer system

This task will include mapping and measurements of sewerlines and manholes, flow testing of trunk lines and transmission mains, and an evaluation of the treatment plant and operation.

Task 3 Complete evaluation and report with specific recommendations for system improvements and retrofits

The engineering consultant will develop a report for Inyo County with specific recommendations for system improvements and retrofits. Specific elements of the report should include:

- Detailed plan and profile mapping of the existing system
- Video camera record of mainline inspection
- Flow test results from identified mains
- Infiltration-Inflow report
- Treatment system evaluation and report
- Specific engineering recommendations for repair or replacements

- A sewer rate analysis

Budget and Schedule

It is estimated that the total cost of this sewer system master plan study will be approximately $87,000. This project will be funded contingent upon available funding from Inyo County and other sources. Once started, the project will take approximately five months to complete.

Deliverables

- Completed evaluation and report from the consultant with specific recommendation for system improvements and retrofits
- Input into updated Inyo-Mono IRWM Plan related to wastewater master planning